IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	GORDAY ET AL.	EXAMINER:	HO
SERIAL NO.:	10/678,416	GROUP:	2664
FILED:	10/03/2003	CASE NO.:	CML01150J

TITLED: SYNC BURSTS FOR FREQUENCY OFFSET COMPENSATION

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May 23, 2007

APPEAL BRIEF FOR APPELLANT
UNDER 37 C.F.R. §1.191

Assistant Commissioner for Patents and Trademarks
Washington DC, 20231

1. REAL PARTY IN INTEREST

The real party in interest in this appeal is Motorola, Inc.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. STATUS OF CLAIMS

This is an appeal from the rejection of 07 May 2007. Independent claims 25, 32, 39, and 44 are the appealed claims. Claims 25, 32, 39, and 44 were rejected under 35 USC 103(a) as being unpatentable over Jones et al. (6876675) in view of Fei (2004/0067741), in further view of Tatem Jr. (6823031). The claims are reproduced below in APPENDIX 1.

4. STATUS OF AMENDMENTS

No amendments have been filed subsequent to this Appeal.

5. SUMMARY OF CLAIMED SUBJECT MATTER

For effective exchange of data signals in a wireless communications system, it is imperative that both the transmitter and the receiver operate at the same frequency. In order to assure that both the transmitter and the receiver operate at the same frequency, the Applicants' invention provides for a technique to synchronize a transmitter and receiver to a same frequency. In order to accomplish this, a transmitter transmits a frequency synchronization burst at various frequencies. Bits within the synchronization burst are used to represent the actual frequency that the burst was transmitted at. For example, in an 8-bit header, seven bits may represent time and frequency position information. Thus, during operation of the Applicants system, a transmitter will transmit multiple frequency synchronization bursts at various frequencies. When a receiver receives a particular burst, the receiver can analyze the burst to determine what frequency the burst was transmitted at, and hence, what frequency the receiver is currently

operating at. Based on this information, the receiver may then adjust its frequency of operation accordingly.

In claim 25 a method for compensation of frequency offset between a first wireless device and a second wireless device is provided. The first wireless device and the second wireless device communicate in order to exchange data packets. (Page 7, line 1). The method comprises the steps of transmitting a plurality of frequency synchronization bursts from the first wireless device to a second wireless device. (Page 7, lines 1-3). Each frequency synchronization burst is transmitted at a particular, but differing frequency offset from a center frequency (page 7, lines 3-4), and each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts from the plurality of synchronization bursts. (FIG. 7, FIG. 8, page 19, lines 14-15). Additionally, each frequency synchronization burst contains bits representing frequency position information. (Page 7, lines 4-6, Page 18, line 7). Finally, transmission of one or more data packets to the second wireless device takes place at the center frequency. (Page 7, lines 11-12).

Claim 32 provides for a method for compensation of frequency offset between a first wireless device and a second wireless device, the first wireless device and the second wireless device communicating in order to exchange data packets. The method comprises the steps of receiving a frequency synchronization burst (page 16, line 9) transmitted at a particular frequency offset from a center frequency (page 16, lines 10-13) and containing bits representing frequency position information for the burst (Page 7, lines 4-6, Page 18, line 7). Finally, the method comprises the step of receiving at the center frequency, one or more data packets. (Page 7, lines 11-12).

Claim 39 provides an apparatus comprising a transmitter transmitting a plurality of frequency synchronization bursts from the first wireless device to a second wireless device. (FIG. 3). Each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from a center frequency. (Page 7, lines 3-4). Each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts from the plurality of synchronization bursts. (FIG. 7, FIG. 8, page 19, lines 14-15). Each frequency synchronization burst contains bits representing frequency position information for the burst. (Page 7, lines 4-6, Page 18, line 7). The transmitter additionally transmits one or more data packets at the center frequency to the second wireless device. (Page 7, lines 11-12).

Claim 44 provides for apparatus comprising a transmitter transmitting a plurality of synchronization bursts from a first wireless device to a second wireless device. (FIG. 3). Each synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing time offset from a data packet. (Page 7, lines 3-4). Additionally, each synchronization burst contains bits representing the time offset of the burst. (Page 21, lines 1-3). The transmitter additionally transmits the data packet to the second wireless device. (Page 17, line 2).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Were claims 25, 32, 39, and 44 properly rejected under 35 USC 103(a) as being unpatentable over Jones et al. (6876675) in view of Fei (2004/0067741), in further view of Tatem Jr. (6823031)?

7. ARGUMENT

(i) *Rejections under 35 USC 112 first paragraph:*

None

(ii) *Rejections under 35 USC 112, second paragraph:*

None

(iii) *Rejections under 35 USC §102:*

None

(iv) *Rejections under 35 USC §103(a):*

Claims 25, 32, 39, and 44 were rejected under 35 USC §103(a) as being unpatentable over Jones (6,876,675) in view of Fei (2004/0067741) in and in further view of Tatem Jr (6823031).

As stated above Applicants' invention provides for a method and apparatus for frequency offset compensation within a communication system. In order to assist in frequency offset compensation, the Applicants transmit a frequency synchronization burst at various frequency offsets. As stated on page 18, lines 7-9 of the published patent application, bits within the synchronization burst are used to represent the frequency offset of the burst. For example, in an 8-bit header, "seven bits may represent . . . time and frequency position information". Fundamentally, our claims specifically cover sending a burst at a particular frequency offset, and sending the time/frequency offset information as data bits in the burst. All of the cited art describes measuring frequency offsets.

<u>CLAIMS 25 and 39:</u>

In rejecting the Applicants' claim 25 and 39, Examiner Ho combines three references. Particularly, Examiner Ho states that Jones discloses synchronization bursts that contain bits representing frequency position information. The Examiner states that Jones is silent to performing frequency offset compensation, and utilizes Fei to fill this void. Finally, the Examiner states that both Jones and Fei are silent to disclosing that each frequency synchronization burst is transmitted at a particular, but differing frequency offset. In order to fill this void, the Examiner utilizes Tatem, stating that this limitation is disclosed in Tatem.

<u>1. Jones fails to teach or otherwise suggest each frequency synchronization burst contains bits representing frequency position information.</u>

Claims 25 and 39 include the limitation that synchronization bursts contain bits representing frequency position information for the burst. The Examiner states that this limitation can be found in Jones in Col. 5, lines 19-21. Analysis of this section reveals that Jones simply states that synchronization bursts are used to acquire timing and

frequency offsets. However, Jones is silent to each burst containing bits representing frequency position information for the burst.

Further analysis of Jones reveals that Jones uses a "supplemental cyclic prefix" to acquire burst and timing frequency offset. (Col. 5, lines 21-22). The Applicants contend that a "supplemental cyclic prefix" is not bits representing frequency position information. Particularly, in col. 5, lines 58-64, Jones reveals that his supplemental cyclic prefix contains a duplicate of transmitted time-domain symbols. Particularly, Col. 6, lines 58-64 state:

> FIG. 5 is a diagram of an OFDM burst 500 according to one embodiment of the present invention. OFDM burst 500, as depicted... includes a v length cyclic prefix 502 and a supplemental cyclic prefix 504 having length L. **Together, v length cyclic prefix 502 and supplemental cyclic prefix 504 duplicate the last v+L of N time domain symbols.** (Col 6, lines 58-64, *emphasis added*)

The frequency offset of Jones is then found to be:

$$f_{offset} = \frac{1}{2\pi M}\tan^{-1}\frac{\operatorname{Im}\bar{d}(\delta^{opt})}{\operatorname{Re}\bar{d}(\delta^{opt})}$$

(Col. 6, lines 35-40).

Thus, as taught by Jones, the supplemental cyclic prefix used for acquiring burst and timing frequency offset, contains only a repetition of time domain symbols. ***These time domain symbols do not represent frequency position information for the burst, as claimed by the Applicants.***

<u>2. Tatem fails to teach or otherwise suggest that each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from a center frequency.</u>

Analysis of Tatem reveals that ***no synchronization burst is even utilized by Tatem***. Particularly, Tatem teaches a system and method which provides automatic frequency control using a voltage controlled oscillator (VCO). (Col. 3, lines 22-23). To accommodate a wide range of offsets between a normal frequency and the local oscillator, a control function is provided by Tatem (referred to as a sweep function) which steps through various operating states of the VCO. (Col. 3, lines 33-38). When the system is initially commissioned, the controller defaults to a particular value that will begin the sweep mode by locking the VCO at a predetermined frequency, such as a frequency approximately in the center of the operating range of the circuit. (Col. 8, lines 14-19). Thus, as is evident, Tatem fails to teach or otherwise suggest the use of synchronization bursts. Clearly, Tatem fails to teach or otherwise suggest that each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from a center frequency.

<u>3. Tatem fails to teach or otherwise suggest that each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts.</u>

As discussed above, Analysis of Tatem reveals that ***no synchronization burst is even utilized by Tatem***. Thus, because of the reasons set forth above, clearly, Tatem fails to teach or otherwise suggest that each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts.

<u>4. There is no motivation to combine Jones, Fei, and Tatem.</u>

The Applicants respectfully disagree with Examiner's contention that the above combination of references would meet the "obvious" requirement under 35 USC §103. Inspection of all references reveal that the main focus of each reference is some form of frequency offset compensation. In citing a motivation to combine these references, the Examiner states that it would have been obvious to combine Jones and Fei "to modify the system of Jones with the teaching of Fei to provide compensation of frequency offset . . ." This motivation to combine makes no sense. Jones is ***<u>already</u>*** performing frequency offset compensation. Jones has no motivation to combine his technique of frequency

offset compensation with that of Fei. The result of combining Jones and Fei would be a system that already does frequency offset compensation that somehow performs frequency offset compensation again.

The same argument can be used for combining Tatem with the erroneously-combined Jones and Fei. In combining Tatem, the Examiner states that the combination would be obvious "to provide each synchronization burst which is transmitted at a different frequency offset in order to estimates the carrier frequency offset with respect to a second station and transmits signals that are responsive to the estimate carrier frequency offset." (Page 5 of the Office Action). Since Jones and Fei ***already*** perform frequency offset compensation, there exists no motivation to add yet another technique of frequency offset compensation.

In summary, there must be some suggestion in either reference that anticipates the combination. In the references cited, there is no such suggestion. When one application deals specifically with frequency offset compensation, it is not proper to combine it with another reference that teaches frequency offset compensation, with a conclusory explanation that it would be obvious to combine the two references to provide frequency offset compensation. Because of this, the above combination of references fail to meet the "obvious" requirement under 35 USC §103.

CLAIM 32:

Claim 32 was rejected for substantially the same reasons as claim 25. In particular, the Examiner states that Jones discloses synchronization bursts that contain bits representing frequency position information. Because of the reasons set forth above, claim 32 is allowable over the prior art of record. More particularly, because the combination of references fails to teach or otherwise suggest receiving a frequency synchronization burst transmitted at a particular frequency offset from a center frequency and containing bits representing frequency position information for the burst, clam 32 is allowable over the prior art of record.

CLAIM 44:

Claim 44 was rejected rejected under 35 USC 103(a) as being unpatentable over Jones et al. (6876675) in view of Fei (2004/0067741), in further view of Tatem Jr.

(6823031). In rejecting this claim, the Examiner failed to consider the limitations of this claim, instead, focusing on the limitations found in claim 25.

Analysis of claim 44 reveals that this claim has the specific limitation that each synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing ***time*** offset from a data packet and each synchronization burst contains bits representing said ***time*** offset of the burst. This limitation was never addressed by the Examiner. Nonetheless, the combination of these references fails to teach or otherwise suggest this limitation. More particularly, Jones uses a "supplemental cyclic prefix" to acquire burst and timing frequency offset. (Col. 5, lines 21-22). Based on the arguments set forth above with claim 25 and 39, the Applicants contend that a "supplemental cyclic prefix" is not bits representing time offset of the burst. Therefore, claim 44 is allowable over the prior art of record.

(i) *Further Rejections:*

None

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CLAIMS APPENDIX

S/N 10/678,416
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25. (Previously Amended) A method for compensation of frequency offset between a first wireless device and a second wireless device, the first wireless device and the second wireless device communicating in order to exchange data packets, the method comprising:

transmitting a plurality of frequency synchronization bursts from the first wireless device to a second wireless device, wherein each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from a center frequency, and each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts from the plurality of synchronization bursts, and each frequency synchronization burst contains bits representing frequency position information; and

transmitting at the center frequency, one or more data packets to the second wireless device.

26. (Previously Amended) The method of claim 25 wherein the synchronization bursts also contains bits representing time position information.

27. (Previously Amended) The method as recited in claim 25 wherein transmitting the plurality of frequency synchronization bursts comprises:

transmitting the plurality of frequency synchronization bursts in a pattern; and

transmitting bits representing a frequency position of each frequency synchronization burst relative to the data packets, the bits being transmitted as a part of the frequency synchronization burst, the relative position of the frequency synchronization bursts being predetermined in terms of time and frequency.

28. (Previously added) The method as recited in claim 25 further comprising the step of retaining an adjusted frequency of the second wireless device after the completion of an exchange of packets.

29. (Previously added) The method as recited in claim 25 further comprising transmitting frequency synchronization bursts before a transmission of beacon packets, the transmission of beacon packets being executed by a network coordinator device.

30. (Previously added) The method as recited in claim 25 wherein the frequency synchronization bursts are transmitted in a monotonic pattern.

31. (Previously added) The method as recited in claim 25 wherein the frequency synchronization bursts are transmitted in a converging pattern.

32. (Previously Amended) A method for compensation of frequency offset between a first wireless device and a second wireless device, the first wireless device and the second wireless device communicating in order to exchange data packets, the method comprising:

receiving a frequency synchronization burst transmitted at a particular frequency offset from a center frequency and containing bits representing frequency position information for the burst, and

receiving at the center frequency, one or more data packets.

33. (Previously added) The method of claim 32 wherein the frequency synchronization burst is one burst from a plurality of plurality of synchronization bursts with each burst being transmitted at a particular, but differing frequency offset from the center frequency.

34. (Previously Amended) The method of claim 32 wherein the synchronization bursts also contains bits representing time position information.

35. (Previously Amended) The method as recited in claim 32 wherein receiving the plurality of frequency synchronization bursts comprises:

receiving the plurality of frequency synchronization bursts in a pattern having bits representing a frequency position of each frequency synchronization burst relative to the data packets, the bits being received as a part of the frequency synchronization burst, the relative position of the frequency synchronization bursts being predetermined in terms of time and frequency.

36. (Previously added) The method as recited in claim 32 further comprising receiving frequency synchronization bursts before a reception of beacon packets, the transmission of beacon packets being executed by a network coordinator device.

37. (Previously added) The method as recited in claim 32 wherein the frequency synchronization bursts are received in a monotonic pattern.

38. (Previously added) The method as recited in claim 32 wherein the frequency synchronization bursts are received in a converging pattern.

39. (Previously Amended) An apparatus comprising:

a transmitter transmitting a plurality of frequency synchronization bursts from the first wireless device to a second wireless device, wherein each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from a center frequency, and each frequency synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing frequency offset from other frequency synchronization bursts from the plurality of synchronization bursts, and each frequency synchronization burst contains bits representing frequency position information for the burst, the transmitter additionally transmitting one or more data packets at the center frequency to the second wireless device.

40. (Previously Amended) The apparatus of claim 39 wherein the synchronization bursts also contains bits representing time position information.

41. (Previously added) The apparatus of claim 39 wherein the frequency synchronization bursts are transmitted before a transmission of beacon packets, the transmission of beacon packets being executed by a network coordinator device.

42. (Previously added) The apparatus of claim 39 wherein the frequency synchronization bursts are transmitted in a monotonic pattern.

43. (Previously added) The apparatus of claim 39 wherein the frequency synchronization bursts are transmitted in a converging pattern.

44. (Previously Added) An apparatus comprising:

a transmitter transmitting a plurality of synchronization bursts from the first wireless device to a second wireless device, wherein each synchronization burst from the plurality of synchronization bursts is transmitted at a particular, but differing time offset from a data packet and each synchronization burst contains bits representing said time offset of the burst, the transmitter additionally transmitting said data packet to the second wireless device.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS

None